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Citrus Insect Control For April, 1956

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AMONG FLORIDA CITRUS LEADERS

W. C. PEDERSEN
President Waverly Growers Cooperative

(See "Off-Grade Fruit Sold In Florida", Page 16)

VOL. 37 — NO. 4 APRIL, 1956 BARTOW, FLORIDA

No. 5 In A Series On

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Herschell Sorrells, of Arcadia, inspects the bloom on a Hamlin tree in a Sorrells Bros. grove. Planted in May, 1950, the 1762 Lake Garfield trees in this block yielded 8,370 boxes of fruit this season — an average of 4.75 boxes per tree.

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Citrus Insect Control

R. B. Johnson

For April 1956

W. L. THOMPSON,
R. M. PRATT
R. B. JOHNSON*
Florida Citrus Experiment Station, Lake Alfred

W. L. Thompson

Both purple and red scale activity increased in March and were at high levels at the end of the month. Purple scale activity will decline somewhat in April and populations will be below average. Red scale hatching is at a high level at the time this is written and infestations are expected to be a little above average in April and May.

Purple mite infestations increased sharply in February and March and will be fairly high in April. However, the problem will not be as severe as it was last year at this time.

Rust mite infestations were a little above average in March and will be about average in April.

Six-spoted mite infestations are at a low level. There will be some increase in April, but control will be required in few, if any groves. Mealybug infestations also will be low.

Spray Program

Post-bloom spraying is now under way following a sudden end to the blooming period in many groves, particularly those that have been irrigated or fortunate enough to receive some rain. For the most part, dry groves are still blooming. In these, it will be necessary to wait until about 90 percent of the petals have dropped before applying sprays.

The continued dry weather has brought up a number of questions. One of these concerns the relationship of irrigation to spraying in general and to the use of oil sprays in particular. Remember that the water table is so low that irrigation water and the water table are not likely to meet, but will leave a dry area in between, particularly in the root zone under the trees. This means that even though surface moisture is good and trees are apparently not suffering for water, there are still roots in dry soil. Under these conditions, any oil spray, regardless of the amount or type of oil is likely to shock the trees into an excessive leaf and fruit drop. Go easy on the oil! Irrigation should always precede spraying for the simple reason that irrigation water will remove all spray materials except oil from the trees. This may seem rather elementary, but it has been a common problem, particularly where sprinkler-type irrigation is used.

Another question growers have been asking this year is, "Since the weather is so dry, is it necessary to use copper for melanose control?" The answer is yes. Although there is little danger of melanose infection on leaves because they are hardening fast, fruit will remain susceptible through July. Since there is a plentiful source of melanose inoculum on the dead wood that resulted from the defoliation of last winter and since there should be some rain befort August, it would not be wise to leave out the copper.

Two pest control problems will face the average grower during April. Florida red scale poses a threat in some groves and purple mites are expected to be at a high level. Most growers will agree that red scale should be controlled, but many wonder if it will be necessary to control purple mite. Although the chances of purple mite doing much damage to trees in the spring is not very great in most years as far as we know, they could be very injurious this spring. Dry weather and heavy winter leaf drop have put many groves in too poor a condition to withstand much mite damage. This year looks like a poor time to forget about purple mite control.

Now back to red scale. Groves with a red scale history should be checked for this pest. If red scale is easy to find, a scalicide should be included in the post-bloom spray. Good control can be obtained during the first half of April since a high percentage of scales will be in the younger, easy-to-kill stages.

Scale Control: Parathion at 1 to 1.7 pounds of 15% wettable powder, its equivalent in other forms of parathion, or 3 to 5 pounds of 25% malathion wettable powder are the preferred scalicides at this time where a number of materials are to be included in the spray and where soil moisture is inadequate for oil. Oil emulsion (either 1.3% oil for mites and scales, or 0.7% oil with 1 pound of 15% parathion per 100 gallons for mites and scales) are likely to cause excessive leaf and fruit drop at this time and will also retard degreening of Valencias. If oil must be used, be sure there is plenty of soil moisture, not just in the middles or at the drip line, but under the trees in the root zone. Also, do not apply oil to oranges after the fruit reaches ½ inch in diameter or oil blotch, a serious grade-lowering blemish, will result.

Purple Mite Control: Although purple mites are numerous in most groves, purple mite eggs are even

(Continued on page 22)

SCALE AND MITE ACTIVITY BY DISTRICTS*

District	Purple Scale	Red Scale	Purple Mite	Rust Mite on leaves	Rust Mite on fruit
West Coast	4.29	1.50	1.42	2.00	1.70
Indian River	3.44	4.21	2.30	.47	.56
Upper East Coast	4.18	1.88	1.88	.50	-1.00
Gainesville	3.27	.34	.00	.00	———
Orlando	3.67	1.34	2.65	.92	.43
Brooksville	3.94	3.06	2.21	1.30	1.50
Ridge	5.22	4.23	2.69	1.30	1.40
Bartow	4.28	3.73	2.20	2.22	2.20
State average	4.15	3.22	2.21	1.12	1.19
Last Year	4.40	3.01	2.62	1.08	1.05

*Third week in March. Activity is computed from populations, amount of hatching of scales, and number of groves with increasing or decreasing infestations. Activity is considered high if above 4.0 for purple scale, 3.0 for red scale, and 1.5 for mites.

* Written March 23, 1956. Reports of surveys by Harold Holtsberg, Cocoa; J. W. Davis, Tavares; K. G. Townsend, Tampa; T. B. Hallam, Avon Park; and L. M. Sutton, Lake Alfred.

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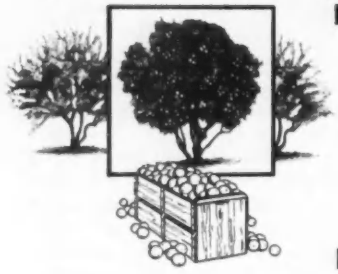

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The Incidence of Xyloporosis (Cachexia) In Certain Florida Citrus Varieties

J. F. L. CHILDS

...By...
J. F. L. CHILDS,(1) G. R. GRIMM,(2), T. J. GRANT,(3), L. C. KNORR,(4), AND G. NORMAN,(5)
AT MEETING FLORIDA STATE HORTICULTURAL SOCIETY

G. R. GRIMM

T. J. GRANT

L. C. KNORR

GERALD NORMAN

Introduction

Evidence of the widespread occurrence of the casual agent of xyloporosis (cachexia) in Florida citrus trees is presented herein. In order that the disease, its cause, and range in symptoms be understood, a brief review is given of significant facts previously established. This is followed by presentation of data obtained from general field observations on bud union disorders, from observations on Orlando tangelo test plants in the budwood certification nursery, and from observations on parent trees in the Certification Program, all of which attest to the high incidence of xyloporosis infection in Florida citrus. The results are discussed in relation to budwood certification.

The casual agent of xyloporosis, a disease of citrus trees on sweet lime (**Citrus aurantifolia**) rootstock first described in 1934 in Palestine (12), is believed to be identical with the casual agent of cachexia, a disease of Orlando tangelo first described in Florida in 1950 (1). The identity is indicated by the following considerations: Xyloporosis is characterized by degeneration of the phloem and xylem of sweet lime rootstock and subsequent deterioration of the citrus

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scion top. On the basis of these symptoms xyloporosis was recognized in Brazil (6) in 1937 and in Florida (5) in 1951. This disease was at first attributed to physiological factors although a virus relationship was considered possible (12). Incompatibility between stock and scion was later suggested (9).

Examinations made in experimental rootstock plantings in Florida (2), and in Texas (10) disclosed that 25 varieties including mandarins, (**C. reticulata**), mandarine hybrids, kumquats (**Fortunella sp.**), and kumquat hybrids, when used as rootstocks, were susceptible to cachexia. Cachexia has been demonstrated to be bud transmissable (2, 3, 11). In a previous report a possible indirect relationship to psorosis virus was discussed (2), but further work indicated that none existed. That the casual agent of cachexia is a separate entity is also shown by Olson's report that it was transmitted with buds from trees tested and certified as free of psorosis (11).

Similarity of the phloem and xylem of cachexia on Orlando tangelo to those of xyloporosis on sweet lime rootstock has been pointed out (2). Transmission of xyloporosis virus from sweet lime to Orlando tangelo and of cachexia virus from Orlando tangelo to sweet lime indicates that in Florida both diseases are probably caused by the same agent (3). The name xyloporosis has priority and consequently will be used hereafter in this paper. It is known that the xyloporosis virus causes severe and extensive phloem symptoms in Orlando tangelo, but it may be present in sweet orange (**C. sinensis**), grapefruit (**C. paradisi**), and certain other species without causing any recognized symptoms (2). Citrus varieties differ in the time required to express disease symptoms. Satsuma mandarin (**C. reticulata**) rootstocks, for example, required 2 years longer than Orlando tangelo to show symptoms (1). Although there is considerable variation in the severity of symptom expression in different varieties this was not emphasized in previous publications.

Distribution of Xyloporosis

It has been suspected for some time that xyloporosis virus is widely distributed without causing symptoms in the commercial varieties of sweet orange and grapefruit in Florida and Texas (5, 11). In fact xyloporosis symptoms have been observed in sweet lime and Everbearing lemon (**C. limon**) rootstock when budded with many different varieties of citrus*. In recent tests, xyloporosis was transmitted to Orlando tangelo test trees from 25 previously unreported varieties (6 species) of citrus. Thus the extent to which xyloporosis virus is distributed in commercial sweet orange and grapefruit varieties is becoming apparent.

Surveys of citrus orchards in Argentina (4, 8) and Florida (7) carried out independently by some of the authors revealed that certain bud-union abnormalities were frequently observed on sweet lime, Everbearing lemon, and Rough lemon rootstocks. The similarity of these abnormalities to the symptoms of xyloporosis in Orlando tangelo prompted an examination of the orchard trees that were candidates for registration as sources of budwood in the Budwood Certification Program, in relation to the Orlando test trees in the nursery where xyloporosis symptoms had been noted.

Phloem discoloration in Rough lemon rootstocks suggesting xyloporosis infection was first noted in Florida in 1953. In addition to showing phloem discoloration, Rough lemon usually exhibits other symptoms consisting of a narrow constriction or indentation of the wood beneath the bark at the bud union and mild pitting of the Rough lemon wood (Fig. 1). There is a corresponding ridge in the cambial face of the bark at which point phloem discoloration is most pronounced and occasionally slight separation of the outer bark tissues occurs at the line of the bud union. To date, these symptoms have been confined almost entirely to Rough lemon rootstocks budded with sweet orange scions (7).

Table 1. The incidence of xyloporosis and the expression of symptoms in sweet orange (C. sinensis) varieties on Rough Lemon (C. limon) rootstock*

Scion variety	Symptoms Present			Symptoms absent, parent tree and nursery trees	Total No. trees
	Parent tree and nursery trees	Nursery trees only	Parent tree only		
Valencia	30	2	11	1	44
Pineapple	18	1	10	5	34
Hamlin	1	2	4	8	15
Jaffa	1	0	0	0	1
Temple	1	2	0	0	3
Percent of total	53	7	26	14	100

* Trees under test in the Florida Budwood Certification Program

Table 2. The incidence of xyloporosis and the expression of symptoms in sweet orange C. sinensis) varieties on sour orange (C. aurantium) rootstock*

Scion variety	Symptoms Present			Symptoms absent, parent tree and nursery trees	Total No. trees
	Parent tree and nursery trees	Nursery trees only	Parent tree only		
Valencia	0	20	0	9	29
Pineapple	0	3	0	7	10
Hamlin	0	2	0	3	5
Lue Gim Gong	0	4	0	4	8
Parson Brown	0	5	0	2	7
Navel	1	2	0	0	3
Temple	0	4	0	1	5
Percent of total	1	60	0	39	100

* Trees under test in the Florida Budwood Certification Program

Table 3. Incidence of xyloporosis and the expression of symptoms in grapefruit (C. paradisi) on Rough Lemon (C. limon) and on sour orange (C. aurantium) rootstocks*

Root-stock	Scion variety	Symptoms Present			Symptoms absent, parent tree and nursery trees	Total No. trees
		Parent tree and nursery trees	Nursery trees only	Parent tree only		
Rough lemon	Duncan	1	3	0	5	9
	Marsh	1	16	0	5	22
	Thompson	0	13	0	3	16
	Red	0	5	0	2	7
Percent of total		4	68	0	28	100
Sour orange	Duncan	0	0	0	3	3
	Marsh	0	12	0	0	12
	Thompson	0	9	0	2	11
	Red	1	6	0	9	16
	McCarty	1	1	0	0	2
Percent of total		4	64	0	32	100

* Trees under test in the Florida Budwood Certification Program

Examination of Nursery Test Trees

Each candidate tree in the Budwood Program is budded on 3 Orlando tangelo seedlings to test for xyloporosis virus which may be present without causing symptoms in the candidate tree. Many of these seedlings have been budded 2 to 2½ years, long enough for some to express symptoms; and it was found, upon examination, that 62 percent of the candidate trees had transmitted xyloporosis to the Orlando tangelo rootstocks. In a few cases, only one of the 3 Orlando tangelo replicates (budded from each candidate tree) had developed typical symptoms but,

* Suit, R. F., E. P. DuCharme, and L. C. Knorr. Citrus Experiment Station, Lake Alfred, Florida, unpublished data.

in the light of previous experience, that is considered evidence that the parent tree is infected.

Examination of Parent Trees

There were 339 candidate trees that had been in the Budwood Program for 2 years or more, and these were carefully examined in order to compare the incidence of their bud union symptoms with the evidence of xyloporosis infection as demonstrated in the nursery test. Of the total trees, 262 were sweet orange and grapefruit trees on Rough lemon and sour orange (**C. aurantium**) rootstocks. The results of these examinations are as follows:

Sweet orange on Rough lemon rootstock: Of 97 candidate sweet orange (5 varieties) on Rough lemon rootstock, 53 percent exhibited bud union symptoms in the parent trees and also induced typical symptoms of xyloporosis in the Orlando tangelo test trees in the nursery. Seven per cent of the parent trees expressed no bud union symptoms but induced symptoms on the Orlando tangelo test rootstocks. Twenty-six percent of the parent trees that exhibited bud union symptoms are negative to date by the Orlando tangelo test in the nursery. Failure of some Orlando test trees to show symptoms when budded from parent trees that are undoubtedly affected by xyloporosis is probably due to the fact that not all Orlando tangelo test trees will show symptoms within 2½ years. The percentages of sweet orange trees on Rough lemon stock free of bud union symptoms in the parent trees and free of xyloporosis in the Orlando tangelo test are as follows: Valencia, 2 percent; Pineapple, 14 percent; and Hamlin, 53 percent (table 1). This group provides evidences that trees of sweet orange varieties may be found that are free of xyloporosis.

Sweet Orange on Sour Orange Rootstock

The 67 sweet orange candidate trees (7 varieties) on sour orange rootstock, with one exception did not reveal symptoms that could be attributed to infection by xyloporosis. Slight phloem discoloration was exhibited by the one tree, and other symptoms such as pitting of the wood or indentation of the wood at the union were absent from all trees. However, when scions of these candidate trees were tested in the nursery, 41 (61 percent) transmitted xyloporosis to the Orlando tangelo test plants, indicating that this virus is present in the same proportion of these sour-orange-rooted trees as in the Rough-lemon-rooted sweet orange trees (table 2), despite its failure to induce recognizable symptoms of xyloporosis in the sour orange stocks.

Grapefruit on Rough Lemon Rootstock

None of the 54 parent grapefruit trees (4 varieties) on Rough lemon root exhibited wood indentation at the union or pitting of the Rough lemon wood adjacent to the union, and only two of them exhibited slight discoloration of the phloem at the bud union. Despite the absence of xyloporosis symptoms in these candidate trees, 72 percent of them transmitted xyloporosis virus to the Orlando tangelo stocks in the nursery test (table 3), indicating that they are symptomless carriers of xyloporosis virus. Why Rough lemon rootstock should show symptoms when budded with xyloporosis-infected sweet orange and not show symptoms when budded with similarly infected grapefruit is unknown at present.

Fig. 1. Constricted bud union of sweet orange (**C. sinensis**) on Rough lemon (**C. limon**) infected with xyloporosis

Grapefruit on Sour Orange Stock

Of the 44 grapefruit trees (5 varieties) on sour orange stock, only two had phloem discoloration at the union suggestive of xyloporosis, although many revealed an irregular surface on the sour orange bark adjacent to the union. When, however, scions of the parent trees were tested on Orlando tangelo seedlings, 30 (68 percent) proved to be carriers of the xyloporosis virus (table 3).

Other Varieties of Citrus in the Nursery Test

Other citrus varieties occurring as parent trees in small numbers or on other rootstocks were infected with xyloporosis virus as shown by the Orlando tangelo test: Pope Summer orange (**C. sinensis**), 10 trees, all infected; sweet orange seedling and Murcott orange (**C. sinensis**), 1 tree each, neither infected; Foster grapefruit, 2 trees, both infected; Orlando tangelo, 8 trees none infected; Minneola tangelo (**C. paradisi x C. reticulata**), 1 tree, infected; Dancy tangerine (**C. reticulata**), seedling, 7 trees, not infected; Satsuma mandarin (**C. reticulata**), 3 trees, 1 infected; Calamondin (**C. mitis**), 1 tree, infected; and limequat (**C. aurantifolia x Fortunella sp.**), 1 tree, not infected with the virus.

It should be emphasized that the nursery test figures are for 2 to 2½ years only and are not final, and the number of Orlando tangelo stocks exhibiting symptoms of xyloporosis can be expected to increase to a maximum at the end of about 4 years.

Summary and Conclusions

In the tests reported here, xyloporosis virus has been found in 30 varieties of citrus not previously reported to harbor the virus. Many of these are not commercially important at present but formerly were grown in Florida or elsewhere to some extent. Bud union symptoms suggestive of xyloporosis have been found in a very high percentage of the sweet orange trees on Rough lemon stock in Florida and Argentina and it has been shown that 62 percent of 339 candidate trees induced xyloporosis symptoms on Orlando tangelo in 2 to 2½ years. Bud union symptoms suggestive of xyloporosis were not found on grapefruit trees of Rough lemon nor in sweet orange or grapefruit trees on sour orange rootstock, though many of these trees are infected with the virus.

The high incidence of infection shown by these results indicates that xyloporosis virus is present in a majority of the sweet orange trees in Florida. If the cause of the described bud union disorder of sweet orange on Rough lemon rootstock has been correctly interpreted, these findings also indicate that certain symptoms heretofore little understood are diagnostic of xyloporosis in Rough lemon, a variety previously considered symptomless.

From the transmission tests mentioned previously (2, 3) and from other experiments not discussed, it is believed highly improbable that the Orlando tangelo test trees were infected from any source other than the candidate trees from which they received buds.

The data presented show that among the commercial varieties of citrus currently and formerly grown xyloporosis virus is widespread. That it has been present many years in Florida even in apparently healthy citrus trees becomes apparent when the age of infected candidate trees is considered. That the citrus industry in Florida has been able to produce citrus fruit successfully in

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spite of the presence of xyloporosis virus is evident. The primary objective of a bud certification program is to assist nurserymen and growers to obtain virus-free trees, and the first step toward that objective is the obtaining of psorosis virus-free budwood sources. This goal appears to be within reach, but the objective of obtaining xyloporosis virus-free trees presents more problems in the light of recent findings. Its attainment may be delayed but eventually can be reached.

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Changes In Commercial Frozen Orange Concentrate

Stored At Several Temperatures(a)

THEO. J. KEW
U. S. CITRUS PRODUCTS STATION(b), WINTER HAVEN, FLA.

The purpose of this work was to subject a variety of commercially produced frozen orange concentrate and excellent retention at 10°, 20° 32°, to several storage temperatures in order to disclose the uniformity or diversity in behavior on storage that might be encountered. It was a further objective to extend the period of storage at low temperatures where changes occur slowly to find out what might occur if these products were purposely or accidentally stored for three years, a situation encountered in the distribution of frozen concentrates.

In 1947 Cotton, Roy, Brokaw, McDuff and Schroeder (3) working with concentrates made in a pilot plant evaporator concluded that storage temperatures of 0°F. or below were desirable to protect the flavor and physical stability after reconstitution. DuBois and Kew (4) working with one commercial frozen orange concentrate found that changes in cloud retention and can condition were detected earlier than those in flavor. They showed that storage temperature is an important factor in maintaining stability of citrus concentrates. Moore, Huggart, and Hill (9) working with experimental packs found indications that gelatin occurs to a greater extent in concentrated juice from seedy varieties of citrus fruit. Huggart, Harman, and Moore (5) reported 98% retention of Vitamin C after one year's storage at —8° F. and excellent retention at 10°, 20°, 32°, and 40° F. for the same period of time. McColloch and Rice (8) currently studying storage stability of frozen orange concentrate have proposed a differential cloud determination as a possible new test to indicate stability. Their results with "thawing index" are in agreement with the findings reported in this paper. In this study typical concentrates were stored for periods up to three years.

Experimental Methods

A lot of the regular commercial product was secured June 4 to 12, 1951, from each of the four largest plants producing frozen orange concentrate. At each plant 480 six-ounce cans were collected consecutively rom the canning line. The cans were transported in insulated containers to the laboratory where the products were assigned code letters to preserve anonymity. The samples collected in 1951 were stored at 35°, 20°, 15°, 10°, 5°, and —4° F.

From March 6 to 13, 1952, lots of commercial frozen concentrate were obtained from ten processors in an attempt to get a cross section of the Florida production. Storage at 35° F. only.

The code used consisted of a letter followed by a number. The letter designated the sample and the number the year. Thus, 0-51 and 0-52 refer to lots of the same brand secured in 1951 and 1952 respectively.

The intervals between examinations were determined by the rapidity of changes which occurred at each temperature, for instance one-day intervals were used at 35° F., 18-day intervals at 15° F., and 200-day intervals at —4° F. While each can was examined separately to avoid unnecessary lapse of time at room temperature, up to six cans were used for each examination and means reported. When cans stored at a particular temperature were judged to be undesirable in flavor and appearance, examinations for that temperature were concluded.

Cloud density observations were made by an adaptation of the cloud index method described by Loeffler for single strength canned juice (6). The concentrates were prepared by placing a can in running tap water for sufficient time to thaw the contents. The concentrate was transferred to a beaker and mixed. An aliquot was reconstituted to 12° Brix. The refractometer was corrected for acid (11). Reconstituted concentrate was centrifuged in 50 ml. tubes for 10 minutes at 1400 r.p.m. (radius of the centrifuge head was 8 inches from center of the shaft to the far tip of the tube carrier when extending horizontally). The supernatant was strained through a 100 mesh stainless steel screen to remove floating juice cells. Trasmittance was measured with an Evelyn colorimeter using a No. 720 filter(b). Cloud density values (2 - log of per centage light transmission) were recorded. Decreasing cloud density values indicate loss of cloud or suspended matter.

Gel ratings described by Olsen, Huggart, and Asbell (10) were recorded where appropriate. Particular emphasis in this report is placed upon the first appearance of a No. 2 gel. More fully developed gels were observed on protracted storage and were used to confirm the date of first gel observation. Accelerated gelatin tests were also run at 35° F. for 96 hours. Pectinesterase activity was

TABLE 1
Analysis of orange concentrates

Sample designation	Acid w/w as citric	Total sol. solids	Brix/acid	Recoverable oil v/v	P. E. at 12° Brix
	%	° Brix	ratio	%	units x 10-4
S-51	3.60	41.52	11.53	0.008	13.4
H-51	3.40	41.57	12.22	0.032	25.0
L-51	3.16	42.00	13.29	0.056	34.7
O-51	3.44	41.53	12.09	0.076	16.4
S-52	3.72	42.61	11.45	0.012	10.4
H-52	3.56	42.18	11.85	0.018	11.5
L-52	3.12	41.81	13.42	0.018	24.0
O-52	3.48	41.95	12.05	0.004	32.2
X-52	3.17	41.96	13.20	0.036	28.0
V-52	3.72	41.60	11.17	0.015	30.3
Y-52	3.76	41.75	11.10	0.032	38.6
N-52	4.10	41.88	10.20	0.019	8.0
Z-52	4.12	41.60	10.10	0.019	23.7
T-52	3.28	41.60	12.67	0.019	23.7

(a) Presented at the 68th Annual Meeting of the Florida State Horticultural Society, Clearwater, November 2, 1955.

(b) One of the laboratories of the Southern Utilization Research Branch, Agricultural Research Service, U. S. Department of Agriculture.

determined on the reconstituted concentrate at 12° Brix by the method of MacDonnell, Jansen, and Lineweaver (7) as described by Bissett, Veldhuis, and Rushing (2). Vitamin C was determined by the method described in the AOAC (1). While flavor evaluations were made by the author, collaboration by others familiar with orange juice flavors was frequently secured and in all instances agreement was obtained.

Results and Discussion

The analyses of the concentrates as received are shown in Table 1. They showed a range of 3.12 to 4.12% in citric acid, 41.52 to 42.61% in total soluble solids, 10.10 to 13.42 in the ratio of total soluble solids to acid, 0.004 to 0.076% in recoverable oil, and 8.0 to 38.6 (P.E.u.) ml x 10-4 in pectinesterase activity when reconstituted to 12° Brix.

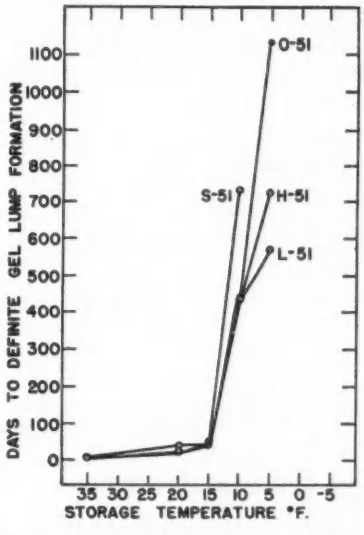

Fig. 1. Time required for cloud density to be reduced to half its initial value (t1°2) for the 1951 samples.

The stability of the cloud will be conveniently reported as the time required for the cloud density value to be reduced to half its initial value. This time is to be designated as t 1/2.

The four samples collected in 1951 showed marked differences in retention of cloud as shown in Figure 1. The changes were so rapid at the higher storage temperatures that the experimental values can not be read from the graph. At 35° F. the cloud density was reduced to half its initial value (t 1/2) for L-51, H-51, 0-51 and 5-51 in 1.0, 1.4, 1.8, and 3.6 days respectively. At 20° F. storage temperature the t 1/2 time for L-51, H-51, O-51 and S-51 was 7.5, 7.5, 15.0, and 32.0 respectively. At 15° F. the range for t 1/2 was 17.5 to 83 days. A sharp break in the data occurred at 15° F. and below this temperature greater stability was observed. The range for t 1/2 for 10° F. storage was 184 to 686 days. At 5° F. storage t 1/2 for L-51 was 550 days and for H-51 was 615 days. At this temperature of storage two of the samples never reached half their initial cloud density values; the percentage of these initial values after three years for S-51 was 98 and for O-51 was 61. At —4° F. all samples retained virtually their initial cloud density values and did not decrease to half the initial cloud density values during the three years' storage. The percentage retentions of initial cloud density values after three years at this temperature were as follows: O-51, 109; H-51, 107; S-51, 107; and L-51, 96.

Cloud density measurements of the four samples placed in storage in 1951 followed the same order of stability at all storage temperatures. This suggested that cloud density measurements of concentrate in 30° F. storage could be used as an accelerated test to indicate relative stability. Furthermore, 30° F. is a temperature in the range found in the household refrigerator. Figure 2 shows the relative cloud stability of 1952 orange concentrate samples as time in days until cloud density was decreased to one-half the initial value (t 1/2) at 36° F. storage One of the samples, N-52, collected in 1952 retained 94% of its initial cloud density after ten days at 35° F. storage at which time the lot was exhausted; consequently a bar portraying this sample is not included in Figure 2. The t 1/2 time for the other nine samples ranged from 0.9 to 18.5 days. This demonstrated a marked difference in cloud stability between the commercial samples tested.

There was an inverse correlation between t-1/2 values and pectinesterase activity in the fourteen lots.

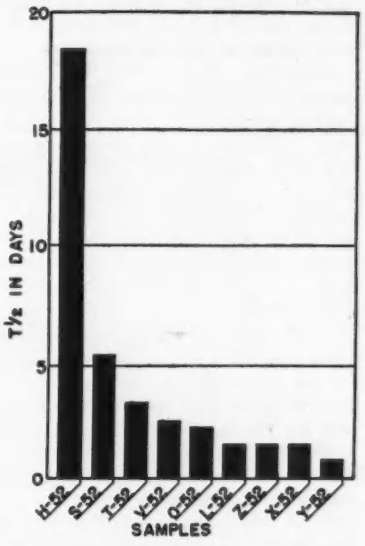

Fig. 2 Relative cloud stability of 1952 orange concentrate samples at time in days until cloud density was decreased to one-half initial value (t1/2) at 35° F. storage.

In general high enzyme values were associated with lower cloud stability, and low enzyme activities with greater stability, r=0.601; P .02).

The effect of storage temperatures on gelatin for the 1951 samples is shown in Figure 3. The four concentrates showed definite gel lumps (No. 2 gels) within 48 days' storage at 15° F. and sooner at higher temperatures. However, a sharp break in the stability of these four samples toward gelation was observed at

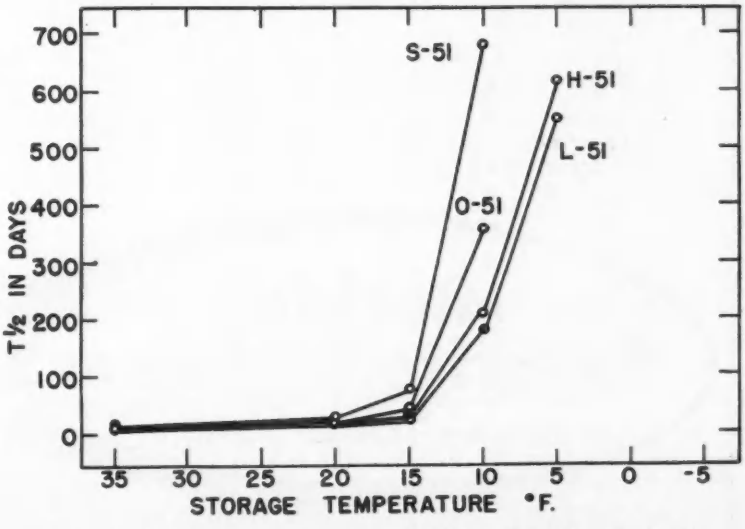

Fig. 3. Time required for appearance of evidence of gelation (No. 2 gel).

(b) The mention of trade products does not imply that they are preferred by the Department of Agriculture over similar products not mentioned.

15° F.; below this temperature gels were slow to develop. Examinations of the concentrate at 10° F. storage for 275 days showed no gelation, and over a year's storage was necessary before any of the samples showed gel lumps. At 5° F. storage one sample showed no gelation in three years. At 4° F. none of the concentrate gelled in three years.

These four 1951 samples were subjected to an accelerated gel test by storing them at 35° F. for 96 hours. Gels developed in two of them, L-51 and H-51, while the others remained negative or questionable. The ten samples obtained in 1952 when subjected to the same gel test showed definite gels in five samples, L-52, X-52, V-52, O-52, Y-52, and none or questionable gels in the other five.

There was a fair correlation between the type of gel that developed in the rapid gelation test at 35° F. for 96 hours and the t 1/2 or half life of the cloud at 35° F. The more fully developed gels were associated with relatively small t 1/2 values, and absence of gelation was usually found with concentrates having longer t 1/2 values, ($r=-0.536$; P .05).

High pectinesterase activities were associated with more fully developed gels and low pectinesterase activities were associated with no gelation, ($r=0.877$; P .01).

No measurable difference in ascorbic acid content was found in any one sample between portions stored at temperatures of 10° F., 5° F., and —4° F., and the values found in the reconstituted concentrate after three-year storage of the concentrates were within the normal range for fresh orange juice.

Normal flavor was retained during progressively longer periods of storage at lower temperatures. No comparison between concentrates was attempted because the initial flavors were not the same, and no inference is made that samples with greater stability possessed superior flavors. The concentrates stored at 10° F. for three years were decidedly off flavor. The flavor of samples stored at 50° F. for three years was slightly impaired but was considered commercially acceptable. After three-year storage the concentrates stored at —4° F. were judged to approximate closely the flavor of the particular concentrate when it was produced.

Summary

Commercial frozen orange concentrates representing a cross section of the Florida products were studied to determine the effects of time and temperature of storage. At 35° F. storage temperature a marked difference in cloud stability was observed between the samples tested. Cloud stability dropped sharply at storage temperatures above 15° F. Below this temperature greater stability was observed with no marked change noted in any of the samples stored at —4° F. for three years. Gelation was observed to occur much more rapidly at 15° F. or above than at lower storage temperatures. No gels were observed after three years at —4° F. Neither flavor nor vitamin C content was appreciably affected in any concentrate after three years at the latter temperature. Increased rates of flavor deterioration were observed at the higher storage temperatures.

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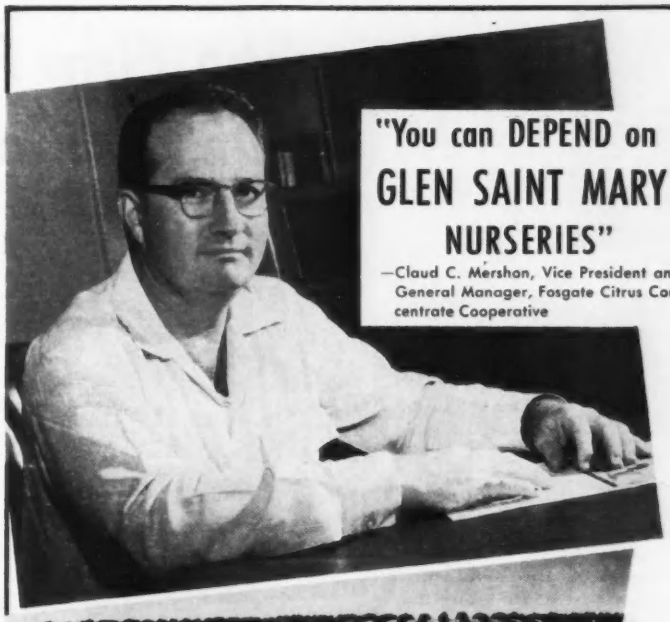
NEW STANDARDS FOR DEHYDRATED GRAPEFRUIT JUICE

The U. S. Department of Agriculture has announced issuance of United States Standards for Grades of Dehydrated Grapefruit Juice. The standards were developed at the request of processors and users of the product.

The standards apply to a granular product which has been reduced to less than 3 percent moisture and packaged with a disiccant to further reduce the moisture content. The product reconstitutes to the equivalent of single-strength grapefruit juice by the addition of a specified amount of cold water. The reconstituted juice contains not less than 15 ounces of grapefruit solids per gallon for unsweetened style and 14 ounces for sweetened style.

The standards provide for classifying the product as "U. S. Grade A" or "U. S. Fancy" "U. S. Grade B" or "U. S. Choice," and "Substandard."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—Claud C. Mershon, Vice President and General Manager, Fosgate Citrus Concentrate Cooperative

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Claud C. Mershon, General Manager of the Fosgate Citrus Concentrate Cooperative, says, "It is a great help when you can buy from companies as dependable as Glen Saint Mary Nurseries. Our experience with Glen has proven the dependability of which they boast is not just words. We have always found that they back up with service anything they say."

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HERB MOSHER

Canadian Firm Pushes Sales Of Florida Fruit

BY HERB MOSHER

The Canadian markets for Florida citrus are, finally being recognized for what they are — among the finest markets to be found anywhere. Canada is forging ahead as one of the leading nations of the world (some figures I have seen recently show that Canadians on the average enjoy a higher income per capita, and a higher standard of living, than even the people of the USA), but because of the climate of the Dominion, much fruit must be imported during the winter-time to maintain health, give zest to living, and so on. I suppose that the greatest need, in this trade with Canada, from the Florida standpoint, is a lower freight rate structure on citrus. Canadian consumers, too, would benefit from lower freight rates, so let's hope that in some manner the present ridiculously high freight rates on Florida citrus to Canada . . . can be "adjusted downward" as the freight rate experts would say it.

Now, in line with Canadian consumption of Florida fruit, I had the good luck recently, to contact one of the leading produce dealers of Canada, and I enjoyed very much, on one of his visits to Florida, showing him around some. This prominent, hard-working gentleman is "Monsieur" J.-Rosaire Blais, B. A., Gerant-D'Achats — Buying Manager, Thompson & Alix, Limited Montreal, Que., and the conversations we had, travelling about Florida resulted in an interview which, I hope, will prove of some real value to citrus operators generally.

I asked M. Blais to tell me, especially, about two things (1) something about how his firm, one of the largest in Canada, merchandises Florida citrus, and (2) something about his firm. So with this introduction complete, let's see what M. Blais said.

"Well, Herb, the history of our Company is quite long, but I will resume it so as to get the quickest possible way to the interest we have in the Florida Citrus Deal.

"Our Company was founded in 1890, and was under the administration of my oldest brother Emile since 1918,

M. J-ROSAIRE BLAIS

until last May, when he passed suddenly at the early age of 55, from a heart attack. The firm is now under the management of his son, Paul, our vice president, who took over at the age of 27, assisted by my second oldest brother, Raoul, who is secretary-treasurer, and myself as Director and general buying Manager. Emile's wife became president.

"We are located in the City of Sherbrooke, called the "Queen of the Eastern Townships" of Quebec, with a population in the vicinity of 60,000 people. We are servicing in a radius of 85 miles a population of about 400,000 people. Of course, don't worry, we have competition. Our effective is a staff of 100 employees with 10 salesmen who cover their territory twice and even three times a week during the summer. Their job is selling, promoting, collecting, and keeping the "bonne entente" with the customers. A fleet of 20 trucks assures the delivery of goods anywhere in the territory within twenty-four hours of the issuing of the order. Of course, we keep a night staff. Mostly all our purchases are made direct from the producing areas and are being handled through a warehouse, with a capacity of 100 carloads in refrigeration, and modernly

UNLOADING FLORIDA FRUIT AT MONTREAL.
Man in center is the late Emile Blais, founder of the Company.

equipped with the latest resigns of conveyors. All departments are separated. Bananas with the round table for selecting and banding small quantities and different departments for prepackaging 20 different commodities, Citrus, Apples, Vegetables, and Potatoes. We carry our own brand name "TAL", and anything that goes into one of these packages has to be nothing but "the best."

"My brother started following the UMI's ideas about classes and prepackaging about five years ago. We gave our retailers free classes by an instructor who came from Kansas City. Our staff followed it, that is our salesmen and heads of departments. We had a French instructor and the retailer's class was held for eight consecutive weeks, with an attendance that exceeded any training course of its kind even in the States. We all learned how to buy fruits and vegetables, how to sell them, how to keep them and how to display. With the results for Florida Citrus as follows:

"Up until two years ago, we were selling a carload of Grapefruits in three weeks, which we were getting direct, 150-200 boxes of oranges that we would include in a car of Grapefruits or buy from the Montreal market 20-25 cases of tangerines a week, with a loss of 3-4 cases every week. By the means of Promotions, with a great deals of cooperation from our retailers, last fall we were selling at a profit, three trailers of Oranges and three of Grapefruits in ten days, making profitable the last three months of the year that were looked as non-profitable before. In order to reduce the cost we started buying in bulk loads, and if I am not mistaking we are the first to do so in the Province of Quebec, and ahead of a great many for such long distance. Anyway it must have been a real hit as we were cited in example by the Canadian Fruit Wholesalers Assn. in their bulletin of March 11th, 1955, and the United in their Fresh Forum of January 31st, 1955. The Tangerine deal was nothing but "formidable," (I think you would call it "terrific"). In a promotion we sold over 1000 boxes within a week, at a profit, against 20-25 with a loss, as in the previous years. Of course our salesmen went out with a box in their car, handing them to the customers in the stores they were visiting, peeling them for the kids and showing them how easy they are, and how tasty. We want as far as making a free distribution with a big Santa Claus

(Continued on page 23)

The Best CITRUS Growers Agree . . .

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Off-Grade Fruit Sold In Florida

W. C. PEDERSEN
PRESIDENT, WAVERLY GROWERS COOPERATIVE

Florida citrus growers and shippers have long realized that it does not pay to sell consumers in the North undesirable grades and sizes of citrus fruit. It hurts the sale and value of all our fruit. However we have been making a practice of getting our northern friends to come to Florida with dreams of eating fruit fresh from the trees in its most desirable state and then stinging them with the worst fruit that we could offer.

Anything that is not suitable to go North is now available to be sold in Miami, Tampa, Jacksonville, and West Florida. A West Florida wholesaler was recently complaining bitterly to me about the poor quality of citrus fruit that is allowed to be sold in West Florida. It is bringing very little money, and poor fruit prevents the regular wholesalers and distributors from moving large quantities of a good product. These sales do not encourage our Florida people to use more citrus fruit.

Off grades and sizes can be made very acceptable when processed, and growers and shippers would get just as much and perhaps more out of it if they sold it to processing plants. This problem has been with us for some time, and many prominent citrus people have proposed doing something about it, but so far very little has been accomplished. Our industry should continue to give this a lot of thought so the next time our legislature meets, some acceptable and practical law can be put in the records.

Florida produces about two- thirds of the citrus fruit grown in the United States. Its grapefruit harvest is about 72 per cent of the world total; Florida's orange and tangerine production is 26 percent of the world total. This state produces about a third of the world's harvest of ail citrus

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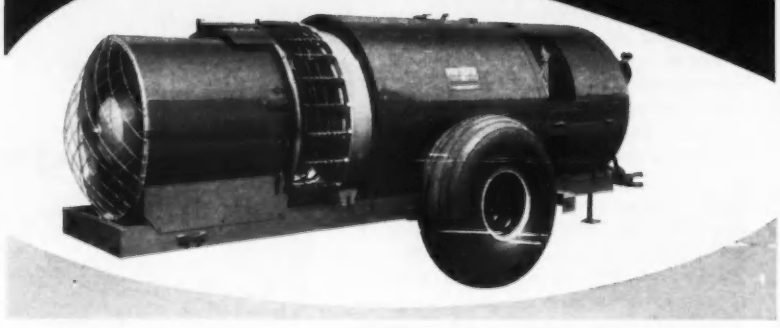

Almost 85% of the commercial citrus acreage in Florida is sprayed by John Bean Speed Sprayers and the reasons why are clear. Speed Sprayers are built in Florida to meet Florida growers' needs. They do an outstanding job and save labor and spray materials in any type of grove, regardless of tree size or spacing. And metallized tanks are just one of many construction features that make them stand up under year after year of hard use with a minimum of maintenance. Write or call us for a Speed Sprayer demonstration — today!

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Imported Lady Beetle May Help Control Some Florida Insect Pests

A lady beetle from India, considered a welcome import by U. S. Department of Agriculture entomologists, is getting a chance to make a home for itself in Florida.

Chilomenes, as this insect is scientifically known, is described by Allen G. Selhime of USDA's Fruit Insect Field Station, Orlando, as a little insect with a big appetitite for many of the serious pests of fruits, vegetables, and ornamentals under culture in Florida. In other tests at Orlando, and Brownsville, Texas, where USDA scientists are rearing it as a potential enemy of the cotton aphid, **Chilomenes** has proved it can build up big populations in a hurry.

Indian scientists who studied this helpful insect in their country reported that a single lady beetle adult devoured 16,321 aphids in six weeks. In their laboratory, two lady beetles laid a total of more than 6,000 eggs.

Mr. Selhime has been studying this insect in the Orlando laboratory since last May. He has found it easy to rear — as long as it is kept well supplied with aphid-infested plant leaves. This lady beetle develops from egg to adult in about 11-12 days and lives as an adult about six weeks.

Starting with 50 adult beetles Mr. Selhime successfully reared and this winter released in 13 different locations in central and southern Florida — generally in orange and tangerine groves that were not under any any kind of chemical spray treatment. This allows the lady beetles the best possible chance for survival.

Chilomenes represents the second promising Indian lady beetle to be released in Florida during the past few months. The other was **Brumus,** a lady beetle that in the laboratory readily ate such Florida pests as aphids, psyllids, whiteflies, mites, some scale insects, and mealy bugs. Survival of both beneficial beetles will be evaluated this summer by Entomologist Selhime.

These and several other promising beneficial insects were collected by USDA's George W. Angelet while he was on assignment to India and Pakistan during 1953-54. Mr. Angelet currently is working in the Far East, looking particularly for insect pests of the six spotted alfalfa aphid, which during the past two years has become a serious menace to this crop throughout the western United States.

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NOTES OF THE TRADE

FRASIER PROMOTED

JAMES L. FRASIER

The appointment of James L. Frasier as Sales Manager of special equipment has been announced by the Florida Division of the Food Machinery and Chemical Corporation in Lakeland.

Mr. Frasier joined the company in 1936, at the Canning Machinery Division in Hoopeston, Ill., where he served successively in the Engineering, Production and Sales departments. In 1953, Mr. Frasier was transferred to the Florida Division where he served in the production department until his recent appointment.

In his new capacity Mr. Frasier will be occupied in selling special production equipment and machinery to phosphate manufacturers in the Florida area and will assist these companies in developing equipment to meet their requirements.

Mr. Frasier attended Purdue University where he obtained a Bachelor of Science degree in Mechanical Engineering. He is married has two children and a resident of Lakeland.

A favorite for dessert is Orange Sections in Sauce. Section 4 large oranges. Set aside. In a sauce pan mix ½ cup sugar and 2 tbsp. cornstarch. Dissovle with 1 cup orange juice and cook until thick. Add 1 tsp. chopped or grated orange peel and 1 tsp. butter or oleo. Cool and pour over orange secitons. Chill or serve at room temperature. Excellent served over custard, tapioca, plain cake as a sauce or garnished with whipped cream and served with cookies.

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(80/82% MAGNESIUM SULPHATE)

Many years a favorite source of soluble magnesia for Florida soils. Used extensively in fertilizer mixtures for citrus crops and vegetables. Especially useful and economical for direct application where only magnesia is required.

Florida growers now consider magnesium a primary plant food in the same category with nitrogen, phosphorus and potash.

The recommendations of the Flordia Citrus Experiment Station at Lake Alfred, published in January 1954, stress the need for large application of magnesium for Citrus in soluble form and state that it is usually applied as a Sulphate.

Ask your fertilizer manufacturer for EMJEO, long a dependable source of this key plant food.

BERKSHIRE CHEMICALS, INC.

420 Lexington Avenue New York 17, N. Y.

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For the BEST in concrete construction

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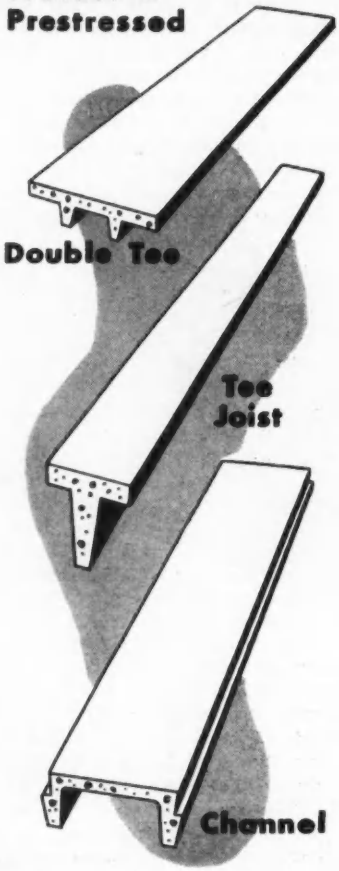

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Please send me complete details about LEAP Prestressed Concrete.

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Produce Dealers License Suspended

Suspension of the Federal license of Percy E. Hutto, trading as Hutto Produce Company, Statesboro, Ga., for violation of the Perishable Agricultural Commodities Act, was announced March 8 by the U. S. Department of Agriculture.

Hutto's license was suspended at the close of business Feb. 29, 1956 for failure to satisfy a reparation award under the Act to R. F. Robinson Marketing Service, Sanford, Fla., by order dated Jan. 24, 1956.

On December 13, 1956, the R. F. Robinson Marketing Service sold to Hutto a quantity of citrus fruits and orange bags having a value of $859.83. Hutto accepted the shipment but paid only $409.83 of the agreed purchase price.

Hutto subsequently failed to reply to a formal complaint filed with the USDA by the R. F. Robinson Marketing Service, and a default order was issued by the Secretary of Agriculture in accordance with the Rules of Practice under the PAC Act, calling for payment of $450.00 plus interest from January 1, 1956.

The Department has announced that it will be unlawful for Hutto to operate as a commission merchant, dealer, or broker, as defined in the Act, during the period his license is under suspension, in his own name, or any other name.

COMMISSION ADVERTISING TO FEATURE VALENCIAS

The Florida Citrus Commission has announced that it will swing its big advertising-merchandising guns to the support of Florida Valencia oranges during March as the world's tastiest, juiciest oranges begin arriving in volume on the nation's markets.

And, while the "Valencia Sweethearts" promotion will get the full Commission treatment during the month, a sustaining advertising program will continue to boost sales for all Florida citrus products.

To kick off the big "Valencia Sweetheart" promotion, the Commission's merchandising department has already prepared more than 35,000 special display material kits containing nearly four million individual pieces of in-store display posters featuring Florida Valencias. To assist the nation's retailers, Commission field men throughout the U. S. and Canada will call on an expected 8,000 grocers during the month to help demonstrate, promote, and merchandise the Valencia crop.

FIFIELD OF FLODIDA NAMED CHAIRMAN OF SOUTHERN AG. GROUP

Willard M. Fifield, provost for agriculture at the University of Florida, was named chairman of the Association of Southern Agricultural Workers at its 1956 session in Atlanta. He was elevated to the post from vice president.

Other Florida agricultural workers honored by their sections included:

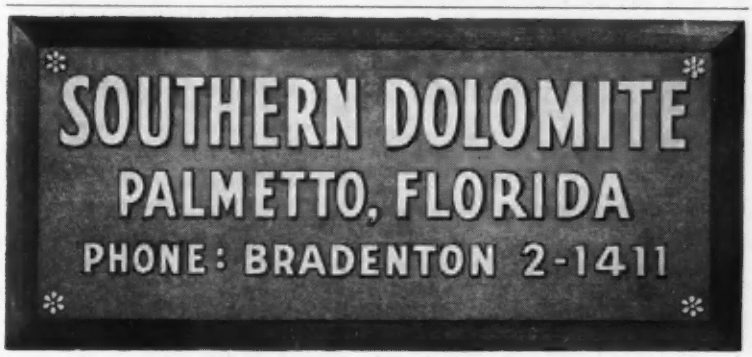
Dr. A. N. Tissot, head of the entomology department in the Florida Agricultural Experiment Station, chosen chairman, Cotton States Branch, Entomological Society of America.

Dr. E. W. Cake, marketing economist with the Agricultural Extension Service, named vice chairman of the marketing section of the ASAW.

ST. LUCIE GROWERS SEE CITRUS SETTING

St. Lucie County citrus growers recently watched a citrus setting demonstration by the Waverly Growers Cooperative, says County Agent C. D. Kine. A tractor with a 30-foot boom lays off rows, then crosses the line left by the boom marker on 25-foot centers. The setting hole in each check is reamed out with a power-driven 18-inch auger, and trees are set by a four-man crew, watered by tank and then hand-mounted.

Spuds Johnson says nearly everybody is willing to be used in the work of the world if they can be in an advisory capacity.



BATHE
YOUR WAY
to HEALTH
Millions have taken the baths at Hot Springs—America's only health resort with natural thermal waters under the regulation of the Director of the Nat'l. Park Service, U.S. Dept. of the Interior —and, countless people have testified to the magic qualities of these world-famous baths. You, too, can find relief for jangled nerves, aching muscles, stiff joints, hardening of the arteries, and, yes, even rheumatism and arthritis.
THE Majestic
HOTEL & BATHS
From $3 per day single
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And you can budget your meals at $4.50 a day
MAJESTIC COTTAGES
SEE YOUR TRAVEL AGENT OR WRITE THE MAJESTIC HOTEL FOR LITERATURE
HOT SPRINGS
NATIONAL PARK,
ARKANSAS

ADVERTISEMENT — LYONS FERTILIZER COMPANY

The LYONIZER

COMPILED BY THE LYONS FERTILIZER COMPANY

Reports Of Our Field Men . . .

EAST HILLSBOROUGH AND PASCO COUNTIES

E. A. McCartney

There is a heavy bloom every where you look. Petals are about gone and spray rigs are beginning to operate.

We need rain as there is some wilt showing and many growers are irrigating. If the present bloom sets we will have another big crop.

The dry weather and steady winds are giving the melon growers a bad time, and coming just after the cold weather most of the melon crops have been retarded.

Valencia oranges fell off in price from the high of a few weeks ago, but growers in this section are expecting prices to pick up again.

Marsh seedless grapefruit have been moving in good volume, but Duncans are still a probelm to the growers. Two blocks of Duncans in this section are being cut back and grafted to oranges while a good sized block of young red grapefruit is being worked over.

Young trees are being fertilized and watered and we are checking for scale and red spider. There are some of both but rust mite is not serious, and will be taken care of in a short while when spraying starts.

SOUTH HILLSBOROUGH AND MANATEE COUNTIES

J. D. Toll

At this time (March 16th) in this territory citrus and vegetable growers who do not have the facilities to irrigate are in need of rain.

Most groves had a good bloom this spring; however, unless unirrigated groves which are lacking sufficient moisture receive rain it is expected that those groves will begin to drop some fruit before it has a chance to set well.

This season's strawberry crop in the Plant City area reached a peak the first week of March. The largest spring crop in that area is pepper.

In Balm the potato crop looks very good considering the dry weather there. They hope to begin digging potatoes the first of April.

The watermelon crop also looks good, but rain is badly needed and melon growers are hoping for a big rain, at least two or three inches. Estimates of Hillsborough county's melon acreage range from 8,000 to 10,000.

WEST HILLSBOROUGH AND PINELLAS COUNTIES

J. A. Hoffman

A heavy flush of new growth and fruit now on the trees require a lot of water. Warm and windy days have dried out the soil moisture a great deal, therefore growers have been irrigating since early in March and the balance plan to start in the next few days.

The spring application of fertilizer has been completed and groves are in excellent condition with the exception of being a little dry. A heavy bloom was reported throughout this section but at this time it is too early to tell how much will set. Most petals have fallen but the dry weather has prevented spraying. An oil spray should be applied as soon as possible where scale and purple mite appear.

Valencia oranges are moving rapidly and could be scarce by late April providing they continue to move at the present rate.

SOUTH POLK, HIGHLANDS, HARDEE, DeSOTO AND SARASOTA COUNTIES

C. R. Wingfield

Regardless of drought, winds or cold we have one of the heaviest citrus blooms for several years. However, unless there is some improvement in the moisture condition there is some question as to how much will set. March 10th a part of this section had a very good rain which ranged from half an inch to four inches. This brought relief to some growers but many have found is necessary to continue irrigation. As of the writing (March 16th) it looks like we might have more rain, but the winds are very heavy and the rain may miss us.

All of the mid-season fruit has been picked but it appears the valencia movement is a little slow in getting started. There was disappointment in the increase of the valencia crop estimate but time will tell whether the crop estimate was reasonably accurate. With the prolonged drouth I do not think valencias have sized up too well, while others attribute the increase in estimate to large sizes of fruit. So this is a debatable subject.

Fertilizer activity has been confined to vegetable crops and feeding of young trees. Attention to young trees has been delayed due to the dry weather but perhaps by this time most of them will have been fed. Some growers are talking about an early summer application to old trees due to the heavy bloom—a viewpoint well taken.

NORTH CENTRAL FLORIDA

V. E. Bourland

We have had only about half inch of rain in the past three weeks, and some growers are irrigating, but the majority of groves are looking very good. All have a tremendous bloom, and it looks like there would be a good crop set.

Red spiders are still working, and most growers are looking forward to the time when they can use oil as D. N. hasn't been doing the job satisfactorily.

Banks have been removed from all young trees, and fertilizer applied, but last week's cold burned quite a bit of new growth on young trees in low spots, also burned new spring grass in some pastures.

HIGHLANDS AND POLK COUNTIES

J. K. Enzor, Jr., & R. E. Lassiter, Jr.

The bloom in Polk county at this time is very well advanced as well as being heavy although in spots where it has been severely dry this bloom has been held back.

We received some good rain on the 10th of March which helped us considerably, however, we are still in need of more moisture and are eagerly awaiting more of these rains. Many growers have been irrigating for quite some time.

At the time of this writing we are delaying any pest control where possible until the young growth is more mature.

In a short time growers will be applying their post-bloom spray.

Young trees that have not been fertilized should be receiving fertilizer as soon as possible.

ADVERTISEMENT — LYONS FERTILIZER COMPANY

Uncle Bill Says:

Seasons play a mighty important part in all our lives . . . all of us is familiar with Spring, Summer, Fall and Winter seasons 'n us growers make our plans fer producin' our crops to a big degree on the basis of plantin' and harvestin' seasons . . . we are also mighty well aware of the right season fer fertilizin' and fer sprayin' . . . then they is cultivatin' and irrigatin' seasons.

They is a lot of other seasons which don't have nothin' to do with our business of producin' crops . . . like the huntin' season, the baseball 'n football season, vacation season, 'n a host of others . . . right now we are gittin' the first touches of the political season . . . one of the roughest seasons of all, 'specially fer the candidates . . . 'cause they ain't no man runnin' fer any office that ain't considered fair game fer any charges that his opponents may level at him, but they is one thing fer sure durin' this season, you kin hardly git two men together who don't right away start talking politics.

A lot of us folks takes our politics pretty serious . . . so they is always danger that friendships kin be disrupted when two folks don't happen to approve of the same candidate 'er the same issues . . . so it's a mark of real friendship when two fellers who happen to be on different sides of any political fence kin remain friends in spite of their differences . . . and when you find a friend who will stay your friend in spite of political differences we'd say you're sure nuf got a real friend.

'n speakin' of friends we've had a friend fer a long, long time that has proven itself over and over again . . . you doubtless know that we're talking about Lyons Fertilizers 'cause this product has done a lot fer growers all over the state . . . it never fails to help us produce Maximum Crops of Highest Quality.

Then along with this splendid fertilizer Lyons has a group of mighty knowin' Field Service Men who have helped us with our growin' problems jist as they have done fer a lot of other growers. They'll be glad to help you, too, if you need 'em.

CITRUS INSECT CONTROL FOR APRIL, 1956

(Continued from page 3)

more numerous. This situation many continue through April. If it does, a miticide that kills mite eggs will be of more value than one that does not. Ovotran at 1 to 1.5 pounds per 100 gallons or oil emulsion (0.7% oil) are the only two miticides that are effective against mite eggs. Since oil may be injurious under the present dry condition, use ovotran unless it has been used in the same grove within the year. If used previously, substitute aramite or EPN-300. If ovotran is used, remember that it kills mites very slowly; so if a fast kill of mites is needed, include ½ pound of 15% parathion per 100 gallons in the spray.

None of the organic miticides are as effective during hot weather as during cool weather and aramite and EPN-300 cannot be used with lime-sulfur or other highly alkaline materials.

Six-spotted mites may be a problem in a few groves. Lime-sulfur at 2 gallons per 100 gallons of spray or any of the recommended miticides are effective if thorough coverage of the under surfaces of the leaves is obtained.

Rust Mite Control: Although rust in a few groves. Lime-sulfur at 2 galeral spring problem, they will be numerous in some groves. The most effective spray is 1 gallon of lime-sulfur plus 5 pounds of wettable sulfur per 100 gallons, but lime-sulfur should not be used on very succulent foliage. If the foliage is very succulent or if aramite or EPN-300 are to be used as miticides or copper is included, use 5 to 10 pounds of wettable sulfur with-

Classified Ads

SUPERIOR CITRUS TREES — Now accepting orders for Fall 1956 and Spring 1957 planting of Valencia, Pineapple and Hamlin. Other varieties available now and for June plantings. Call us GLendale 2-7541 for quotations. Write for FREE copy "Care of Young Citrus Trees."
WARD'S NURSERY
Box 846 Avon Park, Florida

OUTSTANDING DOGS
Bird dogs, Straight cooners, Fox and Deer hounds, Squirrel dogs. Trial allowed. Literature free.
Swannee River Kennels
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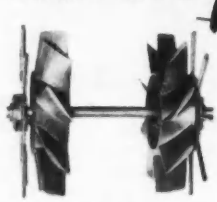
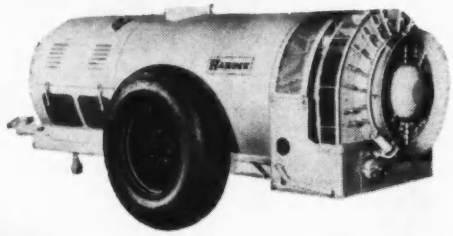
FOR SALE — HAIRY INDIGO. Early $36.00 cwt. Common $35.00 cwt. Free Delivery on 500 lbs. or more.
LEWIS & VICKERS SEED CO.
P. O. Box 1117 — Phone 3828
Haines City, Florida

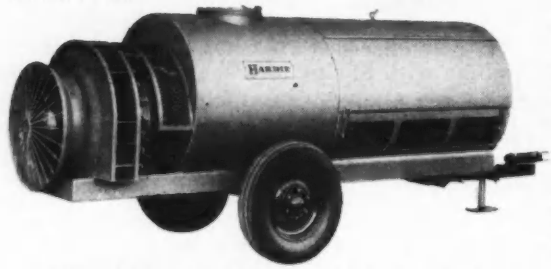
SEE This Great New Hardie HURRICANE®

The Amazing New Air Blast Sprayer With Two Fans



The exclusive Hardie 2-fan assembly consists of two solid, cast aluminum fans of special design, mounted with opposed blades on a single shaft and scientifically spaced. The Hurricane specially designed fan housing delivers the tremendous air volume and velocity of the two fans directly to the spray nozzles without friction loss.





Above—Model DF-26A, 2, 26" fans, Ford V-8 Industrial Engine, 140 HP at 2600 RPM. Model DF-26-B, 2, 26 in. fans, Ford Industrial Engine, 108 HP at 2600 RPM.

At Left — Model DF-24B, low priced, 2, 24 in fans, Willys Hurricane Engine, 70 HP at 4000 RPM.

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Cootie Hardware Furniture Co., White Springs
Daytona Truck and Tractor Equipment Co., Daytona Beach.
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Pounds Motor Co., Winter Garden
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Take one look at a Hardie Hurricane 2-fan Sprayer in action and you know that you are witnessing performance that cannot be matched by any other equipment in the field of pest control. There is a Hardie dealer near you. Let him show you this wonderful new unit that brings new speed, efficiency and economy to citrus spraying.

HARDIE PEST CONTROL EQUIPMENT SOLD AND SERVICED

Manufactured only by
THE HARDIE MFG. COMPANY
Hudson, Michigan

SUPERIOR FERTILIZER AND CHEMICAL COMPANY

FERTILIZERS AND INSECTICIDES THAT ARE SUPERIOR

Factories and Offices: TAMPA and FORT PIERCE, FLORIDA

out the lime-sulfur. The lower amount of sulfur will be adequate if thorough coverage is obtained.

Nutritional Sprays: Any and all of the various nutritional compounds may be applied if 90 percent of the petals have dropped. However, if oil is to be used as a scalicide and/or miticide on oranges, not more than one metallic compound should be included in the spray because too many such materials may break the oil emulsion. On grapefruit, arsenical compounds may be included with copper in oil sprays. If zinc is needed in addition to copper, either apply the copper in the post-bloom oil spray and include the zinc in the first rust mite spray or substitute parathion or malathion for the oil emulsion.

Caution: Be sure there is a long enough waiting period between spraying and picking fruit where organic insecticides are used. Look on the label for instructions.

For more detailed information refer to the 1956 "Better Fruit Program" or consult the Citrus Experiment Station at Lake Alfred or Fort Pierce.

CANADIAN FIRM PUSHES SALES OF FLORIDA FRUIT

(Continued from page 15)

to all the kids of the schools in Sherbrooke. And that's where we stand . . .

"The purpose of my trip down South is to get better acquainted by the trade, and see their way of operating. I have been twice in California, but this is my first visit here and I greatly appreciate the hospitality and I surely wish to come back soon, since it is not all to be well known and well rated in the Blue Book and the Red Book, a personal contact is always effective."

SOLDIERS AND FLIERS WILL EAT MORE FRESH GRAPEFRUIT THIS SPRING

Florida Citrus Mutual has been officially notified that members of the Army and Air Force will get more fresh grapefruit the next three months than originally intended.

Mutual's general manager, Robert W. Rutledge, has just been advised by Col. Ambrose T. McGuckian, chief of the food service division of the Office of the Quartermaster General, Department of the Army, that "action has been taken to increase the usage of fresh grapefruit during the spring season."

GOOD CITRUS FERTILIZERS

CONTAIN

Sul-Po-Mag®

Water Soluble Double Sulfate of Potash Magnesia
($K_2SO_4 \cdot 2MgSO_4$) 22% K_2O—18% MgO

SUL-PO-MAG DELIVERS DOUBLE POWER

Sul-Po-Mag, which is most effective as part of a complete fertilizer, supplies *magnesium* and *potash*, both in quick-acting, water-soluble form.

SULFATE OF MAGNESIUM—Here's soluble magnesium that enables your crop to make full use of all the other plant foods. It improves citrus yield, flavor, size and color, and helps keep your groves healthy, too.

SULFATE OF POTASH—A premium form of potash that contains *less* than 2.5% chlorides and can be safely used to boost the yield and quality of any crop which is sensitive to chloride toxicity.

CITRUS fertilizers containing *Sul-Po-Mag* are better fertilizers . . . better balanced and more effective. That's why so many manufacturers of *quality* fertilizers use *Sul-Po-Mag* in their citrus grades. So see your fertilizer field representative now and order your favorite brand in a grade containing *Sul-Po-Mag* . . . it pays!

SUL-PO-MAG IS ON THE AIR

WDBO Orlando—"March of the Day" 6:55 A.M. Tues.-Thurs.-Sat.

WJAX Jacksonville—"Weather Roundup" 6:45 A.M. Mon. thru Fri.

POTASH DIVISION • INTERNATIONAL MINERALS & CHEMICAL CORPORATION

General Offices: 20 North Wacker Drive, Chicago 6

When You Purchase A Car You Are Deeply Interested In The Service It Will Give . . .

The same motive should influence your selection of the fertilizer you use on your grove or crops.

There are cars which will run faster than others . . . there are cars which ride easier, wear better and which look better than others, but they all have the same number of wheels and generally are much alike in other ways.

So, with fertilizer there appears to be but little difference between many of them, but that fertilizer which has demonstrated its ability to Produce Maximum Crops of Finest Quality to a large group of most successful Florida Growers over a period of many years may safely be considered a very good buy.

Our fertilizers have earned the fine reputation they have over a long period of years, and we believe our field service ranks second to none . . . so in the high quality of our products and our service you'll find these important factors both satisfying and economical in the final analysis.

LYONS FERTILIZERS Produce MAXIMUM CROPS Of FINEST QUALITY

Lyons Fertilizer Company

Phone 43-101

TAMPA, FLORIDA